UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/667,733	09/22/2003	Jong Mu Choi		9677

7590	06/30/2005	

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EXAMINER
LAM, DUNG LE

ART UNIT	PAPER NUMBER
2687	

DATE MAILED: 06/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	10/667,733	CHOI ET AL.
	Examiner	Art Unit	
	Dung Lam	2687	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _22 September 2003_.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-6_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1,2,5 and 6_ is/are rejected.

7)☒ Claim(s) _3 and 4_ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _22 September 2003_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Requirement for Information

1.   Applicant and the assignee of this application are required under 37 CFR

1.105 to provide the following information that the examiner has determined is

reasonably necessary to the examination of this application.

2.   In response to this requirement, please provide the title, citation and copy

of each publication that any of the applicants relied upon to develop the disclosed

subject matter that describes the applicant's invention, particularly as to

developing the power saving routing algorithm and how the RM and HCB

models, the concentric circles and the optimal integer n are all incorporated

together. For each publication, please provide a concise explanation of the

reliance placed on that publication in the development of the disclosed subject

matter.

3.   The applicant is reminded that the reply to this requirement must be made

with candor and good faith under 37 CFR 1.56. Where the applicant does not

have or cannot readily obtain an item of required information, a statement that

the item is unknown or cannot be readily obtained may be accepted as a

complete reply to the requirement for that item.

4.   This Office action has an attached requirement for information under 37

CFR 1.105. A complete reply to this Office action must include a complete reply

to the attached requirement for information. The time period for reply to the

attached requirement coincides with the time period for reply to this Office action.

Priority

5.   Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)–(d),

which papers have been placed of record in the file.

Claim Rejections - 35 USC § 112

6.   The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and
> process of making and using it, in such full, clear, concise, and exact terms as to enable any
> person skilled in the art to which it pertains, or with which it is most nearly connected, to make
> and use the same and shall set forth the best mode contemplated by the inventor of carrying
> out his invention.

Claim 1-6 are rejected under 35 U.S.C. 112, first paragraph, as failing to

comply with the enablement requirement. The claim(s) contains subject matter

which was not described in the specification in such a way as to enable one

skilled in the art to which it pertains, or with which it is most nearly connected, to

make and/or use the invention. The applicant fails to point out what is

considered as an optimal integer n and how it is derived and the significance of

the concentric circle. Further elaboration is needed to enable one of ordinary

skill in the art to make use of this invention.

Claim Rejections - 35 USC § 103

7.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for

all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or
> described as set forth in section 102 of this title, if the differences between the subject matter
> sought to be patented and the prior art are such that the subject matter as a whole would
> have been obvious at the time the invention was made to a person having ordinary skill in the
> art to which said subject matter pertains. Patentability shall not be negatived by the manner in
> which the invention was made.

8.   **Claim 1, 2, and 4-5** are rejected under 35 U.S.C. 103(a) as being

unpatentable over **Stojmenovic el al** (Power-Aware Localized Routing in

Wireless Networks) in view of **Fujita** (US Patent No. 6415161).

9.   Regarding **claim 1**, **Stojmenovic** teaches a method for power saving

routing between a source node and a destination node in wireless networks,

comprising:

(a) a first step of setting an optimal integer value n for reducing power

consumed between the source node and the destination node (the greatest

power savings are obtained when the interval SD is divided into n>1 equal

subintervals, Lemma 1 and Lemma 2 Page 5);

(c) a third step of setting a current execution node to the source node

(source or an intermediate node B should select one of its neighbors, last

paragraph, page 5);

(d) a fourth step wherein said current execution node selects nodes

located within a predetermined distance from the circle that is closest to the

current execution node in the direction of the destination node as candidate

nodes, and selects a node for which power consumed between the node and the

current execution node is minimum from the candidate nodes as an intermediate

node (optimal power saving algorithm ... applying the well known Dijkstra's single

source shortest path algorithm, last paragraph of page 5 and second paragraph

of page 6); and

(e) a fifth step of setting the current execution node as the selected

intermediate node until routing between the source node and the destination

node is finished and returning to the fourth step (The algorithm proceeds until the

destination is reached, Page 6, 4th paragraph).

While *Stojmenovic* does not explicitly teach a second step of setting n-1

concentric circles that have the destination node as their center and dividing a

distance d between the source node and the destination node by n, it is known in

the art that concentric circles are generally used to designate the different zones

power levels to reduce power consumption as taught by **Fujita** (Col. 10 line 62 –

Col. 11 line 15 and Figure 3). Therefore, it would have been obvious to a person

of ordinary skill in the art at the time of the invention was made to integrate

Stojmenovic 's power saving routing algorithm with the concentric circles

settings to maximize the power savings of the routing scheme.

10.   Regarding **claim 2**, Stojmenovic and Fujita teach all the limitations in

claim 1 (see claim 1 above). However, they fail to explicitly teach that the

predetermined distance is in a formula of $d/n - d/(2n)$ to $d/n + d/(2n)$. When the

formula is normalized, it would become a mere range of $d/2n$ to $3d/2n$.

Stojmenovic's Lemma 1 teaches that the greatest power savings are obtained

when the interval between a source and destination is divided into equal

subintervals (page 5, section 4), suggesting that the selected node should fall

within a range. Therefore, it would have been obvious to a person of ordinary

skill in the art at the time of the invention was made to set the predetermine

distance to be within a range to maximize the power savings.

11.   Regarding **claim 5**, Stojmenovic and Fujita teach all the limitations in

claim 1 (see claim 1 above). Stojmenovic further teaches that the fourth step

finds a neighboring node for which $u(r)+v(s)$ (r is a distance between the current

execution node and an arbitrary neighboring node, s is a distance between the

current execution node and the destination node, and $v(x)$ is minimum power

consumption expected between two nodes having a distance x between them)

has a minimum value, and then repeatedly performs the first to fifth steps, having

the neighboring node as the source node, when there is no candidate node (the

proposed algorithms are looking for existing nodes in the network that are closest

to the optimal desirable position, $p(B,A)=u(r)+ v(s)$, Page 6).

12.   Regarding **claim 6**, Stojmenovic and Fujita teach all the limitations in

claim 2 (see claim 2 above). Stojmenovic further teaches that the fourth step

finds a neighboring node for which $u(r)+v(s)$ (r is a distance between the current

execution node and an arbitrary neighboring node, s is a distance between the

current execution node and the destination node, and $v(x)$ is minimum power

consumption expected between two nodes having a distance x between them),

has a minimum value, and then repeatedly performs the first to fifth steps, having

the neighboring node as the source node, when there is no candidate node (the

proposed algorithms are looking for existing nodes in the network that are closest

to the optimal desirable position, p(B,A)=u(r)+ v(s), Page 6).

Allowable Subject Matter

13.   Claims **3 and 4** are objected to as being dependent upon a rejected base

claim, but would be allowable if rewritten in independent form including all of the

limitations of the base claim and any intervening claims.

14.   Regarding **claim 3 and 4**, the prior art of record fails to teach a method as

in claim 1 and 2 respectively, that step four ignores the selected intermediate

node when the selected intermediate node satisfies the condition, $u(r) + u(d/n)$ to

$u(2d/n)$ (r is a distance between the current execution node and the selected

intermediate node, $u(x)$ is power consumption between two nodes having a

distance x between them), and selects the intermediate node again for the

second closest circle in the direction of the destination node.

Conclusion

15.   Any inquiry concerning this communication or earlier communications from

the examiner should be directed to Dung Lam whose telephone number is (571)

272-6497. The examiner can normally be reached on M - F 8-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lester Kincaid can be reached on (571) 272-7922. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-6497.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DL
6/27/2005

LESTER G. KINCAID
PRIMARY EXAMINER